

TAXONOMIC REVISION OF THE GENUS  
*PSEUDOSMODINGIUM* (ANACARDIACEAE)

CARLOS AGUILAR-ORTIGOZA

Facultad de Ciencias, Universidad Autónoma del Estado de México,  
Instituto Literario 100, Toluca Centro, Estado de México, México  
e-mail: aguilarcj@yahoo.com.mx

VICTORIA SOSA<sup>1</sup>

Biología Evolutiva, Instituto de Ecología A.C.,  
Apartado Postal 63, 91000 Xalapa, Veracruz, México.  
e-mail: victoria@ecologia.edu.mx  
<sup>1</sup>author for correspondence

**ABSTRACT.** A taxonomic treatment of the genus *Pseudosmodingium* (Anacardiaceae) is presented. The genus consists of four extant and two fossil species endemic to Mexico. The extant species are small trees from tropical dry forests. The two fossil species have been described from Oligocene strata from Puebla in Central Mexico. Among extant species, *P. andrieuxii* and *P. multifolium* were considered previously as separate taxa; however, we concluded based on both vegetative and floral characters that they can be assigned to the same species, *P. andrieuxii*. The rest of the species (*P. barkleyi*, *P. perniciosum*, and *P. virletii*) are very similar to one another in floral morphology, but variable in leaf morphology. Comments, descriptions, additional notes, specimen citations, distribution, diagnoses, and a key for the extant species of *Pseudosmodingium* are presented.

**Key Words:** *Pseudosmodingium*, Anacardiaceae, Mexico

*Pseudosmodingium* Engl. is a small genus of four extant and two fossil species endemic to Mexico. The extant species are small trees from tropical dry forests, characterized by having imparipinnate leaves, paniculate inflorescences with unisexual and bisexual flowers, and a drupe with two chartaceous wings. All extant species of *Pseudosmodingium* contain toxic catechols (urushiols) in the leaves and bark, causing contact dermatitis (Aguilar-Ortigoza et al. 2003). The two fossil species (*P. mirandae* Ramírez et al. and *P. terrazasiae* Ramírez et al.) have been collected in Oligocene strata of Puebla in Central Mexico (Ramírez-Garduño et al. 2000). The abundance of fossils of *Pseudosmodingium* in these strata suggests a Tertiary origin of the genus (Ramírez-Garduño et al. 2000). The place of origin of the genus was most likely in the dry zones of central Mexico according to results of phylogenetic studies, since *Pseudosmodingium* is grouped with taxa from these areas (Aguilar-Ortigoza and Sosa 2004).

Initially, Baillon (1874) included within the South African genus *Smodingium* E. Mey., the two species *S. andrieuxii* Baill. and *S. virletii* Baill. because their drupes are winged, as in *S. argutum* E. Mey. Later, Engler (1881) segregated these two species into the genus *Pseudosmodingium* based on characters such as a 3-branched style and an anatropous ovule inserted at the base of the ovary. *Rhus perniciosus*, described by Humboldt, Bonpland, and Kunth in 1825, was also transferred to *Pseudosmodingium* based on the morphology of the fruit (Barkley and Reed 1940). Several other species were subsequently described in *Pseudosmodingium*: *P. multifolium* Rose (Rose 1897), *P. rhoifolium* (DC.) F.A. Barkley (Barkley 1937), and *P. barkleyi* Miranda (Miranda 1961). Johnston (1946) described *P. anomalum* I.M. Johnst. without certainty of its position because of the lack of drupes in the type collection. This species was later segregated by Rzedowski (1957) into *Bonetiella* Rzed. because it possessed simple leaves and a wingless fruit.

The remaining species of *Pseudosmodingium* constitute a monophyletic group (Aguilar-Ortigoza et al. 2004). Among synapomorphic characters to define the genus are leaflets showing incomplete marginal venation and leaves grouped at the apex of branches, flowers with valvate sepals, oblong petals, filiform stamens, spheroidal pollen, flower disc with a lobate margin, fruit oblate, seeds with a crustaceous testa, and wood lacking growth rings (Aguilar-Ortigoza et al. 2004). Two groups of species are recognized in the genus, one formed by the fossil species *P. terrazasieae* and *P. mirandae*, together with the living *P. andrieuxii*. Advanced characters shared in this grouping are leaf characters such as outline, margin, venation, and pubescence. These characters were observed in the fossil species from cellulose acetate films prepared from paleobotanical vouchers (Aguilar-Ortigoza et al. 2004). The other group in the genus is formed by *P. perniciosum*, *P. barkleyi*, and *P. virletii*, in which synapomorphic characters are coriaceous leaves with a hypodermis, but without capitate trichomes on the abaxial surface of the leaves, and a wood with procumbent cells in the rays (Aguilar-Ortigoza et al. 2004).

Engler (1881) divided Anacardiaceae into five tribes and classified *Pseudosmodingium* in tribe Rhoëae. In this tribe, several genera in addition to *Pseudosmodingium* possess winged fruits, among them are *Smodingium*, *Cardenasiodendron* F.A. Barkley, and *Loxopterygium* Hook. f. (Barkley 1954, 1962). However, *Pseudosmodingium* is not likely related to the other three genera. A phylogenetic analysis using morphological and anatomical characters showed *Smodingium* and

*Cardenasiodendron* to be closely related to one another, but not to *Pseudosmodingium* (Aguilar-Ortigoza et al. 2004; *Loxopterygium* was not included in this study). Another study, in which species diversification was analyzed using nuclear ribosomal ITS sequences, showed *Cardenasiodendron* and *Loxopterygium* to be sister taxa (Pennington et al. 2004; *Pseudosmodingium* and *Smodingium* were not part of the study). Recent phylogenetic analysis of 22 genera of Anacardiaceae using morphological, anatomical, and phytochemical data show *Pseudosmodingium* to be most closely related to *Astronium* Jacq. and *Schinopsis* Engl. (Aguilar-Ortigoza and Sosa 2004; *Cardenasiodendron* and *Loxopterygium* were not included in this study). A comprehensive phylogenetic analysis is necessary to understand generic relationships fully.

Despite previous phylogenetic and chemical studies in *Pseudosmodingium*, no taxonomic revision of the genus has been carried out. Therefore, a revision of the extant species of the genus is presented in this paper. It is based on both extensive field collections and the study of herbarium specimens.

#### KEY TO THE EXTANT SPECIES OF *PSEUDOSMODINGIUM*

1. Leaves with 13 or more leaflets; margin of leaflets serrate; panicles 4–10 cm long; flowers whitish, yellow at the base of the corolla; drupe pale . . . . . 1. *P. andrieuxii*
1. Leaves with less than 13 leaflets; margin of leaflets entire; panicles 15–38 cm long; flowers whitish; drupe gray or brown . . . . . (2)
  2. Lateral leaflets petiolulate, petiolules 1–2.5 cm long; petals elliptic . . . . . 3. *P. perniciosum*
  2. Lateral leaflets sessile or subsessile, if subsessile the petiolules less than 1 cm long; petals ovate-elliptic or oblong . . . . . (3)
    3. Base of leaflets truncate, not decurrent on the petiolule; panicles 25–38 cm long; anthers pyriform . . . . 2. *P. barkleyi*
    3. Base of leaflets cuneate, decurrent on the petiolule; panicles 15–20 cm long; anthers globose . . . . . 4. *P. virletii*

#### TAXONOMIC TREATMENT

*Pseudosmodingium* Engl., Bot. Jahrb. Syst. 1: 419. 1881. LECTOTYPE here designated: *P. perniciosum* (Kunth) Engl., Bot. Jahrb. Syst. 1: 419. 1881.

Small trees, deciduous, dioecious or polygamo-dioecious, with thickened, dark-colored branches covered with tuberculate leaf scars;

bark papery, reddish brown. Leaves alternate, imparipinnate, clustered near the apices of the branches; leaflets several to many, glabrous to sparsely pubescent. Inflorescence an erect panicle, usually several panicles, clustered near the apex of the branch in the axils of leaves of previous years. Flowers small, on slender pedicels, bracts caducous, deltoid or lanceolate. Sepals 5, erect, glabrous, valvate; petals 5, spreading, imbricate and glabrous. Stamens 5, the filaments scarcely longer than the anthers, anthers globose to pyriform. Ovary 1-celled, winged; style 3-branched, terminal. Drupe flattened, winged, glabrous, exocarp lignified, mesocarp with resin canals, endocarp with four layers; fruit one-seeded; embryo accumbent, endosperm present, cotyledons slender.

A genus of six species, four extant and two fossil species endemic to Mexico, in dry forests or scrublands.

1. *Pseudosmodingium andrieuxii* (Baill.) Engl., Bot. Jahrb. Syst. 1: 420. 1881.

*Smodingium andrieuxii* Baill., Adansonia 11: 182. 1874. TYPE: MEXICO. 1834, *G. Andrieux 184* (HOLOTYPE: P; ISOTYPE: F! [fragment], photo at F!).

*Pseudosmodingium multifolium* Rose, Contr. U. S. Natl. Herb. 5: 143. 1897. TYPE: MEXICO. Oaxaca City, 6 Apr 1895, *E.W. Nelson 2542* (HOLOTYPE: US!; ISOTYPE: XAL!).

Shrubs or small trees; leaves imparipinnate, elliptic or lanceolate in outline, 10–20 cm long, petiole 1–5 (–6) cm, 13–27 leaflets, alternate to opposite, distance between leaflets ca. 1.5 cm, rachis slender; leaflets lanceolate, 1–4 (–5) cm long, 0.3–0.8 cm wide, chartaceous, pubescence of minute club-shaped glandular, simple and stellate trichomes above, glabrous below, except for a sparse pubescence on the main veins, apex acute to acuminate, base cuneate, margin serrate, venation craspedodromous, 12–18 secondary veins, leaflets subsessile, petiolule 0.1–0.5 cm, blade of leaflets dorsiventral, with monostratificate epidermis and stomata of 24–26  $\mu\text{m}$  long, 17–19  $\mu\text{m}$  wide. Inflorescence a panicle, 4–10 cm long, 3–4 cm wide, pedicels 0.3–0.5 cm long, slender; flowers whitish with a yellow center; sepals ovate, slightly imbricated, ca. 0.1 cm long, glabrous; petals oblong to ovate 0.2–0.3 cm long, 0.10–0.15 cm wide, glabrous; stamens barely shorter than the petals, filaments ca. 0.1 cm long, anthers botuliform or pyriform, ca. 0.1 cm long. Drupe broadly winged, oblate, polar diameter 0.6–0.9 cm, equatorial diameter 1.0–1.4 cm, glabrous, straw-colored.

Barkley and Reed (1940) recognized *Pseudosmodingium multifolium* as a different species from *P. andrieuxii*, based on the number of leaflets. However, our observations indicate that variation in the number of

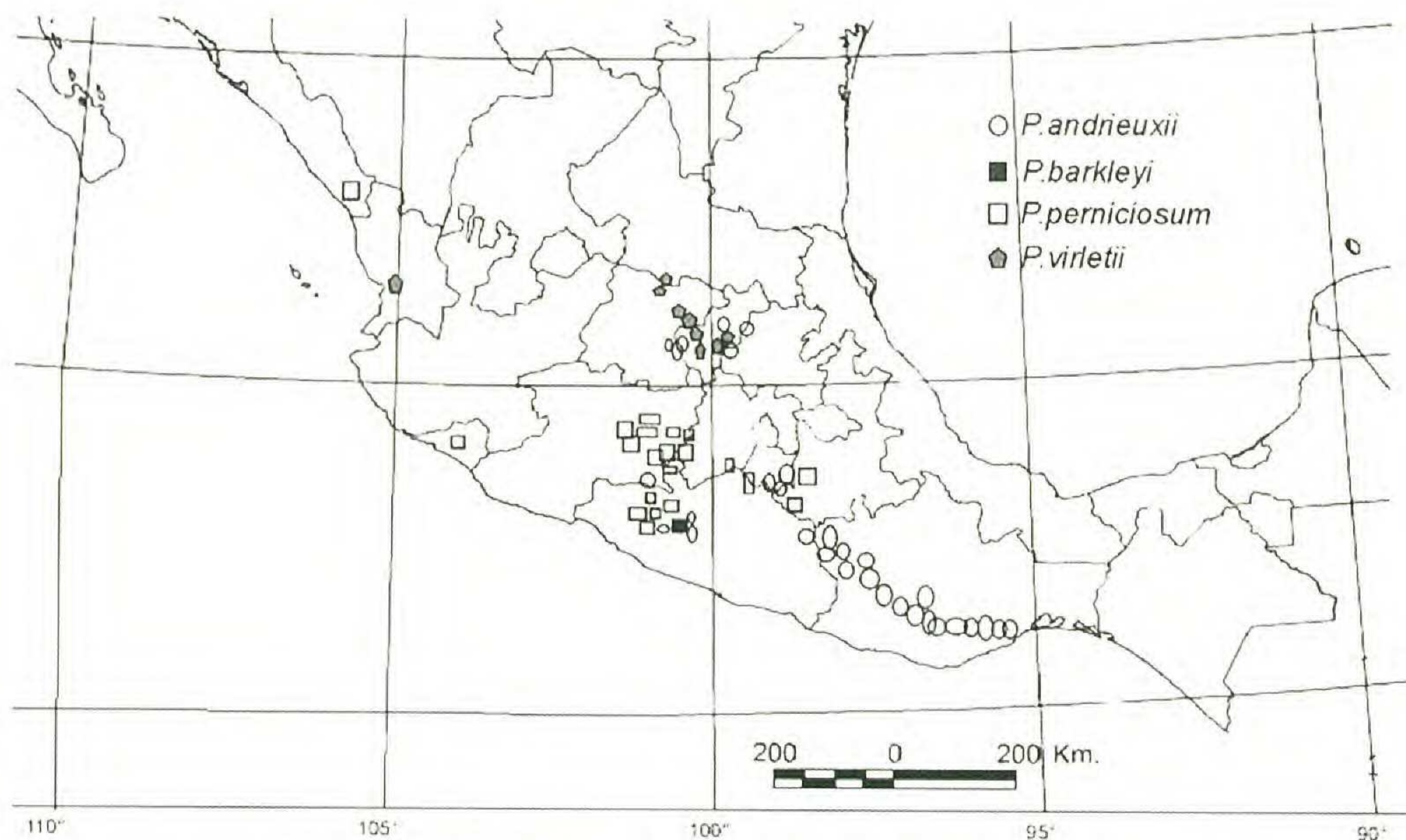


Figure 1. Distribution of *Pseudosmodium* species. All sites lie between 15° and 25° N latitude.

leaflets is continuous. Furthermore, Aguilar-Ortigoza et al. (2004) in their phylogenetic study based on anatomical and morphological characters, found that both species were placed in the same subclade and that there were no autoapomorphic characters for these taxa. *Pseudosmodium andrieuxii* is the most abundant and the most widely distributed species in the genus.

DISTRIBUTION, HABITAT, AND PHENOLOGY: *Pseudosmodium andrieuxii* is found in central and southern Mexico, from San Luis Potosi to Oaxaca (Figure 1). The species is common in xerophytic habitats. It grows from 200 to 1900 m elevation. It flowers from March to May.

USES: This species is one the most toxic in the genus. Contact with leaves causes acute dermatitis. It is given common names such as “pirulillo” or “xhonguo” in otomí dialect.

SPECIMENS EXAMINED: MEXICO. Guerrero: Chilpancingo, Chilpancingo City, 4 Feb 1978, *M. Germán & F. Guevara* 667 (FCME, MEXU); Eduardo Neri, Carrizal, 19 Feb 1995, *M. Luna* 809 (FCME); Eduardo Neri, Casa Verde to Xochipala, 2 Feb 1965, *R. McVaugh* 22189 (ENCB); Eduardo Neri, Zumpango del Rio, 11 Jun 1978, *M. Blanco et al.* 290 (ENCB); Eduardo Neri, Km 15 S. Xochipala, 22 Mar 2000, *C. Aguilar* 1207 (XAL); Iguala, Cañón de la Mano, 21 Dec 1978, *C. Catalán et al.* 584 (CHAPA, IEB). Hidalgo: Izmiquilpan, May 1905, *C. Purpus* 3168 (GH); Izmiquilpan, 1905, *J. Rose* 8956 (US); Tecozautla, May 1914, *F. Salazar s.n.* (US); Zacualtipán, Rio Venados, 24 May 1985, *A. Espejo* 1757 (IEB, UAMIZ); Zimapán, Barranca Tolimán, Apr 1947,

*H. Moore* 2585 (GH); Zimapán, Barranca Tolimán, Aug 1948, *H. Moore & C. Wood* 4413 (GH); Zimapán, Rio San Juan, 6 Apr 1990, *A. Gómez* 654 (IEB). Oaxaca: Carretera Oaxaca-Tehuantepec, Valle de la Ceiba, Mar 1949, *M. Carlson* 1483 (F); Tlacolula, Totolapan, 23 Mar 1994, *S. Acosta* 2417 (OAX); Tlacolula, Totolapan, 12 Mar 1986, *R. Torres* 8217 (IEB, MEXU, XAL); Villa Alta, San Mateo Cajones, 12 May 1986, *R. Gereau & A. Moyer* 168 (OAX); Cuicatlán, Cuesta de Quiotepec, 23 Apr 1919, *C. Conzatti* 3556 (US); Ejutla de Crespo, Ejutla, 18 Feb 1985, *R. López et al.* 318 (OAX); Etna, El Parian, Mar 1909, *C. Conzatti & I. Cancino* 2435 (US); Huajuapán de León, Huajuapán, Aug 1963, *H. Gentry et al.* 20296 (F); Huajuapán de León, La Reforma, Apr 1984, *R. Torres* 4999 (XAL); Ixtlán, El Fortín, 14 Mar 1898, *C. Conzatti & V. González* 669 (GH, MO); Ixtlan, Ixtlan to Ixtepeji, Apr 1983, *G.H. Martin* 682 (MO); Ixtlan, Jalapa del Marquez, 26 Feb 1986, *C. Martínez* 456 (MEXU); Juchitán, Guevea de Humboldt, 16 Mar 1983, *R. Torres* 2537 (XAL); Matías Romero, La Puerta, 16 Feb 1982, *R. Torres* 35 (MEXU, XAL); Miahuatlán, Valle de Oaxaca, 1841–1843, *F. Liebmann* 259 (US); Miahuatlán, Cuixtlán, 18 Mar 1988, *R. Torres* 11840 (IEB, MEXU, XAL); Nacaltepec, Cuesta de Ejutla, Jun 1895, *L. Smith* 459 (GH); Oaxaca, Cerro del Tule, 31 Mar 1907, *C. Conzatti* 1799 (F); Oaxaca, Monte Albán, Jun 1899, *J. Rose* 4574 (US); Oaxaca, Oaxaca City, 6 Apr 1895, *E. Nelson* 2542 (GH, US, XAL); San Lucas Quiavini, *s.d.*, *C. Robles* 38 (OAX); San Carlos Yautepec, Tapanala, 28 Apr 1988, *S. Acosta* 946 (IEB, OAX); San Carlos Yautepec, Tapanala, 6 Mar 1987, *A. Flores* 1167 (IEB, OAX); Tamazulapan, Puente Río del Oro, 12 Apr 1987, *R. Torres* 9599 (MEXU, XAL); Tehuantepec, Cerro Guingola, 15 Sep 1985, *L. Torres* 171 (IEB, MEXU), 18 Mar 1987, *L. Torres* 830 (IEB, MEXU); Tenango, Buenos Aires, 26 Mar 1984, *L. Torres* 4793 (MEXU); Teotitlán del Camino, 15 Mar 1966, *C. Smith & N. Tejeda* 4445 (US); Municipality Teotitlán del Camino, Apr 1978, *M. Sousa* 9327 (MO); Zoquitlán, 1 Km SW Buenavista, 28 Apr 1988, *S. Acosta* 945 (IEB, OAX); Río Yalalag, Apr 1919, *B. Reko* 4154 (US). Puebla: Caltepec, Cerro Yaltepec, 12 Jan 1984, *P. Tenorio* 5114 (XAL); Caltepec, El Tecomite, San Simón, Mar 1984, *P. Tenorio* 5549 (MEXU); Matamoros, Amatitlán, Dec 1942, *F. Miranda* 2509 (MEXU); Tehuacan, Tehuacán-Teotitlán del camino, Apr 1986, *O. Dorado & A. Salinas s.n.* (IEB, MEXU); Tehuacan, Tehuacan, Sep 1906, *J. Rose* 11533 (US); San Luis Tultitlanapa, May–Jun 1908, *C. Purpus* 3168 (F, GH, MO, NY); Zapotitlán de las Salinas, Salinas de Rinconada, 5 May 1979, *J. Calzada* 5359 (XAL); Salinas de Rinconada, 7 Apr 1979, *F. Zavala* 75 (XAL); Salinas de Rinconada, 4 May 1979, *J. Calzada* 5341 (XAL). Queretaro: Cadereyta, Cañada de la culebra, 8 Jun 1993, *S. Zamudio* 9511 (IEB); Cadereyta, Vizarrón, 1 May 1978, *S. Zamudio* 2783 (IEB); San Joaquín, La Tinaja, 8 Mar 1996, *S. Zamudio* 9765 (IEB, MEXU); Peñamiller, Peñamiller, 11 Apr 1977, *S. Zamudio* 2030 (IEB); Peñamiller, 11 Apr 1977, *S. Zamudio* 2034 (IEB); Peñamiller, 1 km north of Peñamiller, 13 Apr 1977, *S. Zamudio* 2087 (IEB).

2. *Pseudosmodingium barkleyi* Miranda, Bol. Soc. Bot. México 26: 123. 1961. TYPE: MEXICO. Guerrero: Cañón del Zopilote, km. 246 carretera México–Acapulco, 15 Oct 1960, *A. Gómez-Pompa* 390 (HOLOTYPE: MEXU!). Figure 2d, e.

Small trees, 3–5 m. Leaves imparipinnate, oblong in outline, (21–) 23–30 cm, petioles (6–) 8–11 (–13) cm long, (7–) 9–13 leaflets, distance between leaflets ca. 5 cm, rachis thick, striate and pubescent; leaflets oblong-ovate, 5–8 (–9) cm long, (3–) 5–8 cm wide, chartaceous to

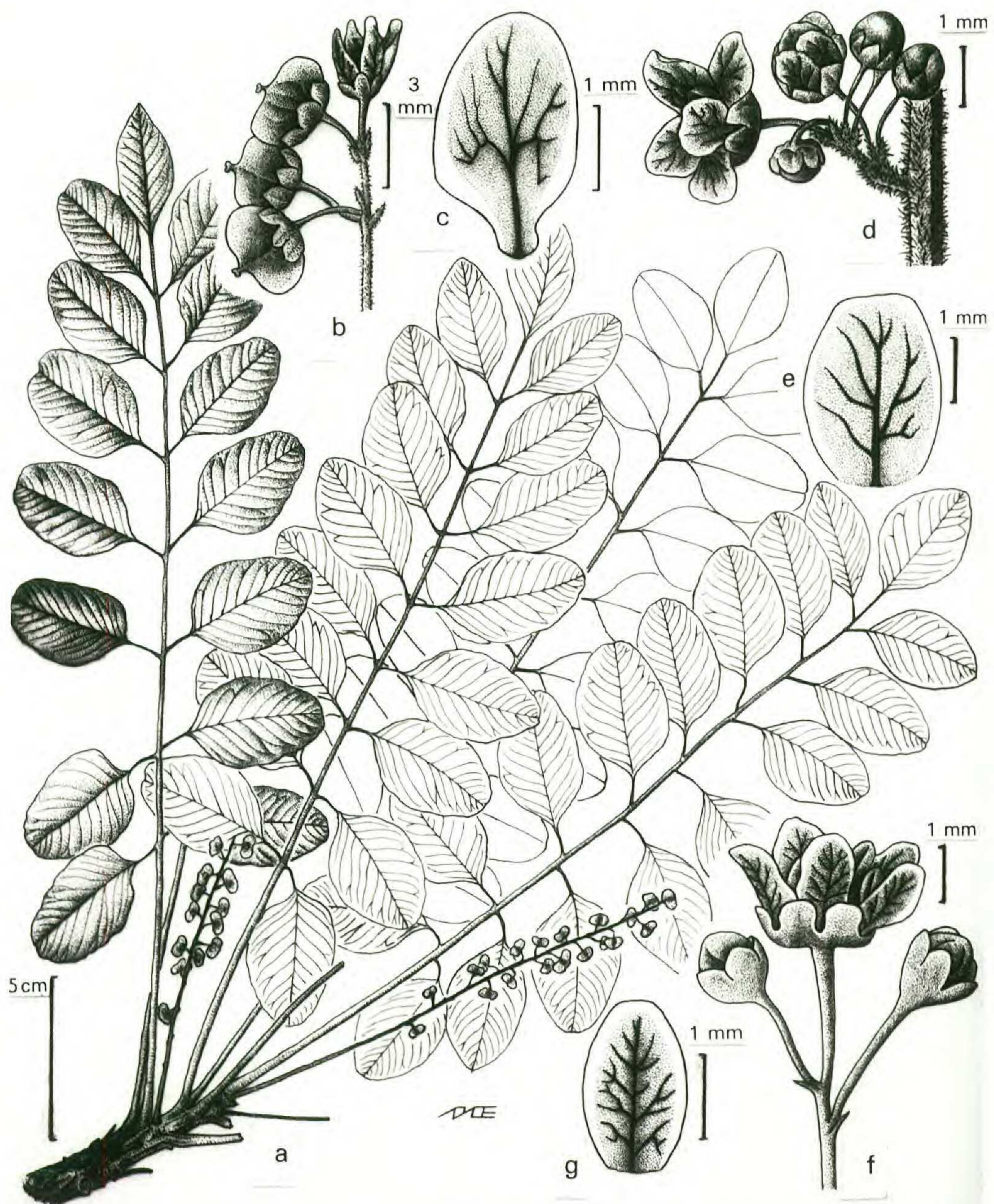


Figure 2. Morphological features of *Pseudosmodingium* species. a. Leaves and inflorescences of *P. perniciosum* (Guerrero 776). b. Branch with flower and fruit of *P. virletii* (Zamudio 9655). c. Petal of *P. virletii* (Zamudio 9655). d. Branch with flowers of *P. barkleyi* (Aguilar 1199). e. Petal of *P. barkleyi* (Aguilar 1199). f. Branch with flowers of *P. perniciosum* (Guerrero 776). g. Petal of *P. perniciosum* (Guerrero 776).

subcoriaceous, pubescence of simple and capitate trichomes, veins and margins whitened, margin entire, apex truncate-mucronate, base truncate to subcordate, base unequal, venation cladodromous, with 14 to 18 secondary veins, petiolules of lateral leaflets of 0.1–0.3 cm, petiolule of

terminal leaflet 0.2–0.4 cm, blade of leaflets dorsiventral with monostratificate epidermis and stomata of 24–28  $\mu\text{m}$  long, 18–19  $\mu\text{m}$  wide. Inflorescence a panicle, 25–38 cm long, 7–12 cm wide, 28–30 branches, 25–45 flowers in basal branches, pedicels 0.2–0.4 cm long, slender; flowers whitish, sepals imbricate, suborbicular to deltoid, 0.4–0.7 cm long, petals ovate-elliptic ca. 0.2 cm long, ca. 0.1 cm wide, glabrous; filaments 0.07–0.1 cm long, anther pyriform, 0.05–0.08 cm. Fruit a drupe, broadly winged, oblate, polar diameter 0.6–0.8 cm, equatorial diameter 0.9–1 cm, glabrous, grayish.

*Pseudosmodingium barkleyi* is the species with the most restricted distribution, having been collected in only a few locations in the area of Cañon del Zopilote.

DISTRIBUTION, HABITAT, AND PHENOLOGY: Endemic to Guerrero, Mexico (Figure 1). This species grows in tropical dry forests on karstic soils. It flowers from April to August.

USES: As with all *Pseudosmodingium* species, contact with leaves and bark of *P. barkleyi* produces dermatitis. It is known locally as “cuajiote” or “tetlate.”

SPECIMENS EXAMINED: MEXICO. Guerrero: Cañon del Zopilote, road to Xochipala, Eduardo Neri, Mar 2000, *C. Aguilar 1199* (XAL); Cañon del Zopilote, 31 May 1980, *A. González s.n.* (FCME); Km 14 carretera Mezcala–Chilpancingo, 15 Jul 1981, *R. Fonseca 175* (FCME, MEXU); Km 3 carretera Tlalcozotitlan–Copalillo, 7 Aug 1982, *R. Fonseca 407* (FCME); NW Huamuchtitlan, 5 Aug 1982, *R. Fonseca 399* (FCME); Km 5.5 NW de Mezcala, 3 Jul 1980, *J. Contreras 404* (FCME); 2 km W Huitzuco, 3 Oct 1981, *G.H. López & H. Gutiérrez 49* (FCME).

3. *Pseudosmodingium perniciosum* (Kunth) Engl., Bot. Jahrb. Syst. 1: 420. 1881. Figure 2a, f, g.

*Rhus perniciosa* Humb., Bonpl. & Kunth, Nov. Gen. Sp. 7: 10. 1825. TYPE: MEXICO. Guerrero: Tepecuacuilco, *s.d.*, *A. von Humboldt & A. Bonpland 3955* (HOLOTYPE: P, photo at P!).

*Rhus pterocarpus* DC., Prodr. 2. 84. 1825. TYPE: MEXICO. 1787–1804, *M. Sessé, J.M. Mociño, J.D. del Castillo & J. Maldonado 4938* (HOLOTYPE: F! [fragment], photo at F!).

*Spathelia* (?) *rhoifolia* DC., Prodr. 2. 84. 1825, in part.

*Pseudosmodingium pterocarpus* (Sessé & Moc.) F.A. Barkley, Ann. Missouri Bot. Gard. 24: 263. 1937.

*Pseudosmodingium rhoifolium* (DC.) F.A. Barkley, Ann. Missouri Bot. Gard. 24: 500. 1937.

*Rhus pterocarpus* Sessé & Moc., Pl. Nov. Hisp., p. 47. 1888, in part.



Trees, 4–10 m; leaves imparipinnate, oblong in outline, (22–) 25–36 (–40) cm long, 10–20 cm wide, petiole (5.5–) 8–13 cm long, 9–15 leaflets, distance between leaflets ca. 4 cm, rachis coarse, glabrous, leaflets obovate to rhombic-ovate, 3.5–7 cm long, 1.5–5 cm broad, coriaceous, glaucous, glabrous to a sparse pubescence of simple trichomes, veins and margins whitened, margin entire, apex truncate to subacute, sometimes mucronate, base cuneate, decurrent to the petiolule, base unequal, venation cladodromous, with 18–22 secondary veins, lateral petiolules 1.5–2.5 cm long, terminal petiolule 3–4.5 cm, blade of leaflets dorsiventral with monostratificate epidermis and several giant stomata of 32–38  $\mu\text{m}$  long, 19–25  $\mu\text{m}$  wide. Inflorescence a panicle 15–35 (–38) cm long, 7–10 cm broad, (10–) 15–22 (–24) branches, 10–38 (–45) flowers on basal branches, pedicels 0.4–0.5 cm long, slender; flowers whitish, sepals slightly imbricate, suborbicular to deltoid, ca. 0.1 cm long, petals elliptic ca. 0.2 cm long, ca. 0.12 cm wide, glabrous; filaments 0.07–0.1 cm, anthers globose, 0.05–0.1 cm. Fruit a drupe, broadly winged, oblate, polar diameter 0.6–0.8 cm, equatorial diameter 0.9–1.2 cm, glabrous, brown.

This species displays a great variation in leaflet shape, which causes problems in species recognition. We here include as synonyms *Pseudosmodingium rhoifolium* and *P. pterocarpus*. Barkley (1937), when transferring *Rhus pterocarpus* to *Pseudosmodingium*, mentioned that *P. pterocarpus* was very similar to *P. perniciosum*. Furthermore, when Barkley transferred *Spathelia rhoifolia* to *P. rhoifolium*, he considered that it was the same species as *P. pterocarpus*. Based on the principle of priority, the name should be *P. rhoifolium*. Aguilar et al. (2004) included *P. rhoifolium* as a terminal taxon in their morphology-based phylogenetic study. Its placement was problematic because it was known only from the type specimen and the only characters available were leaf characters. However, the position of *P. rhoifolium* was in the same clade as *P. perniciosum*. The epithet refers to the toxicity of the leaves and bark, contact with which can cause severe dermatitis.

DISTRIBUTION, HABITAT, AND PHENOLOGY: Endemic to Mexico, mostly on the western slopes of the Pacific mountains (Figure 1). *Pseudosmodingium perniciosum* is found in tropical dry forests, on limestone soils, from 700 to 1500 m. It flowers from May to September.

USES: This is the most toxic species of the genus. In Guerrero, the leaves are crushed and used to heal wounds. It bears local names such as “cuajote colorado” and “hincha huevos.”

SPECIMENS EXAMINED: MEXICO. Colima: Comala, El Terrero, 31 Jan 1987, *R. Cuevas & M. Rosales 1765* (IEB). Guerrero: District Mina, Placeres-Cigarrillo, 31 Nov 1936, *G.H. Hinton 9794* (GH); Ashotla, N of Rio Balsas, 16 Nov 1937, *Y. Mexía 8824* (F, GH); Ahuacoutzingo, Trapiche viejo Km 40 a Chilapa, 8 Oct 1982, *S. Acosta & R. López 72* (IEB, XAL); Coyuca, Chacamerito, 8 Nov 1934, *G.H. Hinton 6946* (F, GH); Coyuca, Chirapitiro, 26 Oct 1934, *G.H. Hinton 6868* (F); Coyuca, Pungarabato, 11 Jun 1934, *G.H. Hinton 6939* (GH); Cacahuamilpa, Rio Chontalcoatlán, 4 Oct 1964, *L. González 747* (F); Eduardo Neri, Km. 12 N of Zumpango, 16 Sep 1994, *J. Calónico 1249* (FCME); Iguala, Cañon de la mano, 26 Oct 1986, *C. Catalán 387* (IEB); Iguala, Montañas above Iguala, 5 Oct 1900, *C. Pringle 8385* (F, GH); Taxco, 7 Oct 1958, *F. Cox 1873* (XAL); Zirandaro, Km. 22 S Zirandaro, Apr 1970, *G. Tellez s.n.* (FCME). State of Mexico: Barranca de los Muñecos, Tejupilco, 14 Sep 1999, *C. Aguilar 1197* (XAL); Bejucos, Tejupilco, District Temascaltepec, 11 Nov 1933, *G.H. Hinton 5198* (GH); Bejucos-Palmar Chico, Tejupilco, Apr 1981, *I. García 131* (CODAGEM); Cerro de Nanchititla, Tejupilco, 8 Sep 1954, *E. Matuda et al. 31590* (CODAGEM, MEXU); El Salto de Nanchititla, 600 m, Sep 1990, *C. Aguilar 107* (CODAGEM); 38 km. S of Mexico City, Jul 1940, *C. Hitchcock & L. Stafford 7052* (GH); District Temascaltepec, Ocotepc, 24 Nov 1934, *G. Hinton 7034* (F, GH, NY, XAL); Naranjo, District Temascaltepec, May 1932, *G. Hinton 1993* (GH, NY). Michoacan: Apatzingan, Aguililla, Sep 1939, *G. Hinton 15300* (GH); Apatzingan, 20 Aug 1941, *W. Leavenworth & H. Hoogstraal 1710* (F, XAL); Apatzingan, 22 Aug 1941, *W. Leavenworth & H. Hoogstraal 1757* (F, GH); Aquila, Cerro Ojo de Agua, 2 Apr 1980, *B. Guerrero 776* (XAL); Arteaga, 8 Dec 1977, *J. Cházaro 753* (XAL); El Zopilote, Mar 1903, *E. Nelson 6976* (GH, MO, US). Morelos: Alpuyeca, 7 km a las Grutas, 24 Oct 1983, *S. Acosta 1983* (XAL); Cuernavaca, near Xochicalco, 18 Jul 1938, *L. Kenoyer 651* (F); Cuernavaca, Cuernavaca, 1905, *J. Lemmon 194* (F, GH, MO); Miacatlán, Cerro las Cantinas, 3 Nov 1981, *A. Monroy 1690* (XAL); Tepalcingo, El Limón, 19 Nov 1980, *R. Ortega 1561* (XAL); Tepalcingo El Limón, Tepalcingo, 19 Nov 1980, *A. Guerrero 1332* (IEB); Yautepec, 3 km. E of Amador Salazar, Nov 1984, *M. Ishiki 984* (IEB). Nayarit: Tepic, Volcán Ceboruco, 26 Sep 1995, *J. Cházaro 7584* (XAL). Puebla: Jolalpan, San Pedro de las Palmas, 9 Jul 1990, *R. Razo & R. García 111-38* (IEB); Zapotitlan, Santa Ana Teloxtoc, 4 Apr 1979, *F. Zavala et al. 1670* (XAL). Sinaloa: Culiacán, Bagracitos, 9 Dec 1982, *P. Tenorio 3016* (IEB); Culiacán, Meza Malqueson, cerro Colorado, 8 Dec 1939, *H.S. Gentry 5173* (GH).

4. *Pseudosmodingium virletii* (Baill.) Engl., Bot. Jahrb. Syst. 1: 420. 1881. Figure 2b, c.

*Smodingium virletii* Baill., Adansonia 11: 182. 1874. TYPE: MEXICO. Province of San Luis: 1851, *V. d'Aoust 1044* (HOLOTYPE: P, photo at F!).

Small trees or shrubs, 2–4 m; leaves oblong in outline, 20–23.5 cm long, petiole 5–10 cm long, (9–) 11–13 (–15) leaflets, distance between leaflets ca. 2.2 cm, rachis thick, glabrous, leaflets oblong to obovate, 3–5 (–6) cm long, (1–) 2–3 cm wide, coriaceous, glaucous, cerose, glabrous or with a sparse pubescence of simple and stellate trichomes, sometimes orange-colored, margin entire, apex truncate-emarginate, base cuneate, decurrent on the petiolule, venation cladodromous, with 18–20

secondary veins, lateral petiolules 0.3 cm long, terminal petiolule 1.5 cm, blade of leaflets isobilateral with polystratified and small sunken stomata of 14–18  $\mu\text{m}$  long, 9–17  $\mu\text{m}$  wide. Inflorescence a panicle, (13–) 15–20 (–25) cm long, 5–10 (–12) cm wide, 14–22 branches, (18–) 20–40 (–45) flowers in basal branches, pedicels 0.6–0.7 cm long, slender; flowers whitish, sepals slightly imbricate, ovate ca. 0.1 cm long, petals oblong, whitish, venose, ca. 0.2 cm long, ca. 0.12 cm wide, glabrous; filaments 0.1 cm, anthers globose 0.05–0.1 cm. Fruit a drupe, broadly winged, oblate, polar diameter 0.6–0.7 cm, equatorial diameter 1.0–1.3 cm, glabrous, brown.

Rzedowski and Calderón (1999) reported hybrids between *Pseudosmodingium andrieuxii* and *P. virletii* in the “El Bajío” area. The two species grow sympatrically in some localities and some plants have the number, pubescence, and shape of leaflets of *P. andrieuxii*. They have 13 leaflets, with an acute apex, and the same pubescence. However, the texture and color of the pubescence of the leaflets are similar to those of *P. virletii*. The authors mentioned that the putative hybrids produced flowers and fruits. They come from Cadereyta in Queretaro, which is part of “El Bajío.” We also observed these characters [*S. Zamudio & E. Pérez 9510* (IEB); *S. Zamudio 3556* (IEB)].

**DISTRIBUTION AND HABITAT:** Endemic to the central area of Mexico (Figure 1). *Pseudosmodingium virletii* grows in xerophytic scrublands and in dry tropical forests at elevations between 700–1500 m.

**USES:** The small trees are planted as fences mainly in pasturelands; the toxic catechols prevent cattle from crossing these fences. This species is given common names such as “chichote,” “guau,” and “xhangua,” the two last names in otomí dialect.

**SPECIMENS EXAMINED:** MEXICO. Hidalgo: Jacala, Barranca Seca, Jacala to Pacula, 29 Apr 1947, *H. Moore 2743* (GH). Guanajuato: Xichú, Mina la Aurora, 30 Oct 1986, *J. Rzedowski 41486* (IEB). Queretaro: Arroyo Seco, to Jalpan de Serra, 29 Mar 2000, *C. Aguilar 1204* (XAL); San Joaquín, Cañada de la Culebra, 18 Nov 1978, *S. Zamudio 3556* (IEB); Cadereyta, Cañada de la Culebra, 8 Jun 1995, *S. Zamudio & E. Pérez 9510* (IEB); Ayutla, 2 km. N road Jalpan-Rio Verde, 28 Mar 1984, *A. García & L. Vargas 1379* (MEXU, XAL); Jalpan de Serra, Río Estorax Canion, 5 Mar 1996, *S. Zamudio 9655* (IEB); Landa de Matamoros, Puerto Blanco, 13 Mar 1988, *A. Herrera 107* (IEB); Municipality Cadereyta, La Tinaja, 8 Jul 1995, *S. Zamudio 9510* (IEB).

**ACKNOWLEDGMENTS.** The project was made possible by grants from PROMEP and from the Universidad Autonoma del Estado de México

(1837-2004 to C.A.O). Manuel Escamilla prepared the illustrations. We thank Francisco Lorea for his help in obtaining herbarium specimens as well as his guidance with regard to nomenclatural matters. We express our sincere thanks to the curators of the following herbaria for access to specimens: F, FCME, GH, IEB, MEXU, MO, NY, OAX, P, US, XAL.

## LITERATURE CITED

- AGUILAR-ORTIGOZA, C. J. AND V. SOSA. 2004. The evolution of toxic phenolic compounds in a group of Anacardiaceae genera. *Taxon* 53: 357–364.
- , ———, AND M. AGUILAR-ORTIGOZA. 2003. Toxic phenols in various Anacardiaceae species. *Econ. Bot.* 57: 354–364.
- , ———, AND G. ANGELES. 2004. Phylogenetic relationships of three genera in Anacardiaceae: *Bonetiella*, *Pseudosmodingium*, and *Smodingium*. *Brittonia* 56: 169–144.
- BAILLON, D. H. 1874. *Smodingium*. *Adansonia* 11: 182.
- BARKLEY, F. A. 1937. *Pseudosmodingium rhoifolium*. *Ann. Missouri Bot. Gard.* 24: 500.
- . 1954. *Cardenasiodendron*, a new genus of Anacardiaceae (Rhoideae). *Lloydia* 17: 239–246.
- . 1962. Anacardiaceae: Rhoideae: *Loxopterygium*. *Lloydia* 25: 109–122.
- AND M. J. REED. 1940. *Pseudosmodingium* and *Mosquitoxylum*. *Amer. Midl. Naturalist* 24: 666–679.
- ENGLER, A. 1881. Über die morphologischen verhältnisse und die geographische verbreitung der gattung *Rhus*, wie der mit ihr verwandten, lebenden, und ausgestorbenen Anacardiaceae. *Bot. Jahrb. Syst.* 1: 365–426.
- HUMBOLDT, A., A. BONPLAND, AND K. S. KUNTH. 1825. *Nova Genera et Species Plantarum*. Lutetiae Parisiorum.
- JOHNSTON, I. M. 1946. Noteworthy species from Mexico and adjacent United States. *J. Arnold Arbor.* 24: 227–236.
- MIRANDA, F. 1961. Plantas nuevas del Sur de México. *Bol. Soc. Bot. México* 26: 120–132.
- PENNINGTON, R. T., M. LAVIN, D. E. PRADO, C. A. PENDRY, S. K. PELL, AND C. A. BUTTERWORTH. 2004. Historical climate change and speciation: Neotropical seasonally dry forest plants show patterns of both Tertiary and Quaternary diversification. *Philos. Trans.* 359: 515–538.
- RAMÍREZ-GARDUÑO, J. L., S. R. CEVALLOS-FERRIZ, AND A. SILVA-PINEDA. 2000. Reconstruction of the leaves of two new species of *Pseudosmodingium* (Anacardiaceae) from Oligocene strata of Puebla, Mexico. *Int. J. Pl. Sci.* 161: 509–519.
- ROSE, J. N. 1897. *Pseudosmodingium multifolium*. *Contr. U. S. Natl. Herb.* 5: 143.
- RZEDOWSKI, J. 1957. Notas sobre la flora y vegetación de San Luis Potosí. *Ciencia (México)* 16: 139–142.
- AND G. CALDERÓN. 1999. Anacardiaceae. *Flora del Bajío y Regiones Adyacentes*, fasc. 28. Instituto de Ecología, A.C., México.